

## AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method, comprising:

allocating a single space to accommodate a mark bit and an allocation bit, the mark bit and the allocation bit relating to garbage collection occurring at a virtual machine;  
integrating the mark bit and the allocation bit into a single mark/allocation bit using at the single space to free other spaces for other system functions; and  
corresponding the mark/allocation bit with an object in a heap, wherein the mark/allocation bit occupies the single space, the mark/allocation bit to perform dual functions of the mark bit and the allocation bit by alternating between the mark bit and the allocation bit via the single space.

2. (Original) The method of claim 1, further comprising:

resetting the mark/allocation bit; and  
switching the mark/allocation bit to the allocation bit to perform root set enumeration.

3. (Original) The method of claim 2, further comprises performing the root set enumeration by utilizing the mark/allocation bit as the allocation bit to conduct pointer identification of the object in the heap.

4. (Original) The method of claim 3, further comprising:

resetting the mark/allocation bit; and  
switching the mark/allocation bit to the mark bit to perform marking and scanning of objects using the identified object.

5. (Original) The method of claim 4, further comprising:
  - marking the identified object as a root object;
  - scanning one or more objects associated with the root object by utilizing the mark/allocation bit as the mark bit; and
  - marking the scanned one or more objects associated with the root object.
6. (Original) The method of claim 5, further comprising:
  - retaining the marked root object and the marked one or more objects associated with the root object; and
  - regenerating allocation bits for the retained objects.
7. (Original) The method of claim 3, wherein the performing of the root set enumeration comprises lazy and selective root set enumeration.
8. (Original) The method of claim 7, wherein the lazy and selective root set enumeration comprises lazily and selectively identifying the root object in a segment of the heap and regenerating the allocation bits for the root object and other objects associated with the root objects residing in the segment of the heap.

Claims 9-13 (Cancelled)

14. (Currently Amended) A system, comprising:
  - an allocation interface to allocate a single space to accommodate a mark bit and
  - an allocation bit, the mark bit and the allocation bit relating to garbage collection occurring at a virtual machine;

an integration module to integrate the mark bit and the allocation bit into a single mark/allocation bit using at the single space to free other spaces for other system functions; and

a correspondence unit to correspond the mark/allocation bit with an object in a heap, wherein the mark/allocation bit occupies the single space, the mark/allocation bit to perform dual functions of the mark bit and the allocation bit by alternating between the mark bit and the allocation bit via the single space.

15. (Original) The system of claim 14, further comprising:

a resetting routine to reset the mark/allocation bit;  
a switching module to switch the mark/allocation bit to the allocation bit to perform root set enumeration; and  
a root set enumeration module to perform the root set enumeration by utilizing the mark/allocation bit as the allocation bit to conduct pointer identification of the object in the heap.

16. (Original) The system of claim 15, further comprising:

the resetting routine to reset the mark/allocation bit;  
the switching module to switch the mark/allocation bit to the mark bit to perform marking and scanning using the identified object; and  
a mark/scan unit to  
mark the identified object as a root object,

scan one or more objects associated with the root object by utilizing the mark/allocation bit as the mark bit, and

mark the scanned one or more objects associated with the root object.

Claims 17-19 (Cancelled)

20. (Currently Amended) A machine-readable medium ~~having stored thereon data representing sets of comprising instructions which, when executed by a machine, cause the a machine to:~~

~~allocate a single space to accommodate a mark bit and an allocation bit, the mark bit and the allocation bit relating to garbage collection occurring at a virtual machine;~~

~~integrate the mark bit and the allocation bit into a single mark/allocation bit using~~

~~at the space to free other spaces for other system functions; and~~

~~correspond the mark/allocation bit with an object in a heap, wherein the~~

~~mark/allocation bit occupies the single space, the mark/allocation bit to~~

~~perform dual functions of the mark bit and the allocation bit by alternating~~

~~between the mark bit and the allocation bit via the single space.~~

21. (Currently Amended) The machine-readable medium of claim 20, wherein the ~~sets of instructions which, when executed by the machine which when executed, further cause the machine to:~~

~~reset the mark/allocation bit; and~~

~~switch the mark/allocation bit to the allocation bit to perform root set~~

~~enumeration.~~

22. (Currently Amended) The machine-readable medium of claim 21, wherein the ~~sets of instructions which, when executed by the machine which when executed,~~ further cause the machine to perform the root set enumeration by utilizing the mark/allocation bit as the allocation bit to conduct pointer identification of the object in the heap.
23. (Currently Amended) The machine-readable medium of claim 22, wherein the ~~sets of instructions which, when executed by the machine which when executed,~~ further cause the machine to:
  - reset the mark/allocation bit; and
  - switch the mark/allocation bit to the mark bit to perform marking and scanning using the identified object.
24. (Currently Amended) The machine-readable medium of claim 23, wherein the ~~sets of instructions which, when executed by the machine which when executed,~~ further cause the machine to:
  - mark the identified object as a root object;
  - scan one or more objects associated with the root object by utilizing the mark/allocation bit as the mark bit; and
  - mark the scanned one or more objects associated with the root object.
25. (Currently Amended) The machine-readable medium of claim 24, wherein the ~~sets of instructions which, when executed by the machine which when executed,~~ further cause the machine to:

retain the marked root object and the marked one or more objects associated with the root object; and

regenerate allocation bits for the retained objects.

26. (Original) The machine-readable medium of claim 22, wherein the performing of the root set enumeration comprises lazy and selective root set enumeration.

Claims 27-30 (Cancelled)

31. (New) The method of claim 1, wherein the virtual machine comprises a Java virtual machine.
32. (New) The system of claim 14, wherein the virtual machine comprises a Java virtual machine.
33. (New) The machine-readable medium of claim 20, wherein the virtual machine comprises a Java virtual machine.